

E·O·H·S·S

Environmental & Occupational
Health & Safety Services

A Newsletter for the UMDNJ Laboratory Community

In the News

Live Anthrax Mix-up

Be sure to submit a protocol to your campus Institutional Biosafety Committee (IBC) and use caution if you are using a dangerous microorganism, even if it has been certified to be inactive or attenuated. Good biosafety practices protected researchers and prevented laboratory contamination from live anthrax when a lab was provided with live, rather than killed, anthrax bacteria. With the explosion in biodefense funding, accidents such as what happened at Children's Hospital and Research Center (CHRC) at Oakland, California are likely to recur.

In May 2004, six laboratory personnel and an animal handler at CHRC inadvertently utilized live anthrax while trying to create an anthrax vaccine using *Bacillus anthracis* that had supposedly been heat inactivated. They were all put on a 60-day regimen of ciprofloxacin. Subsequent cultures of nasal swabs have come back negative.

The researchers had received the specimen from Southern Research Institute (SRI), who had shipped the *Bacillus anthracis* from its facility in Frederick, Md., by FedEx in February. CHRC is not authorized to handle select agents (biological agents thought to

pose the greatest threat of use in terrorism and warfare). Inactivated and avirulent or vaccine strains of select agent microorganisms are exempt from the registration, security, shipping and biosafety rules established for select agents.

The anthrax was injected into mice in early May. Over the next couple of days, ten mice which had been housed in separate cages died and were placed in a freezer. The lead researchers were not informed that all the mice had died in the first experiment. Then, in early June, another batch of mice were injected and they all died too. Subsequent attempts to culture both the material and a sample from one of the dead mice both showed the bacteria was alive. The Federal Bureau of Investigation removed the remaining material from the lab on June 9.

The California Department of Health Services inspected CHRC and concluded that the lab had handled the bacteria properly. Although microorganisms, attenuated for use as killed or live vaccines, may no longer require the same containment as the wild-type parent organism, a comprehensive risk assessment of the experiments must be performed by the Institutional Biosafety Committee. Fortunately, in this case of *Bacillus anthracis*, BL-2 containment was augmented with strict control of aerosols. Researchers had been

wearing respirators and protective clothing. In addition, the air entering and leaving the lab was HEPA - filtered.

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Update

Animal Allergies

"WARNING! Exposure to animals or animal products in the workplace can cause asthma and allergies" is the first line in the publication, "Preventing Asthma in Animal Handlers." (available at <http://www.cdc.gov/niosh/animalrt.html>). In this publication, the National Institute for Occupational Safety and Health (NIOSH), a division of the Centers for Disease Control and Prevention, reports that there are two million workers with jobs requiring constant handling of animals. One third of these workers have allergic symptoms, and 10% have occupational asthma caused by animal allergens.

People who work with laboratory animals (animal caretakers, technicians, and researchers), or who handle animals with some frequency, are at risk for developing laboratory animal allergy (LAA). Rats, mice, rabbits and cats are the primary allergenic species.

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Animal Allergies

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Unfortunately, LAA may also affect persons who don't work directly with animals as the following examples illustrate:

- * Allergens are sticky and may be carried on an exposed person's hair or clothing.
- * Allergens may be present on door handles, phones and other objects.
- * Allergens may become airborne, adsorbed onto small particles from dirty bedding from rodent cages. These may be inhaled.
- * In some cases, laboratory animals are brought into the lab, or are housed in a lab near personnel who are not working with them.

Health Effects

Direct contact with animal hair or skin may result in hives or a more serious skin rash. Animal allergies can be mild and may include a runny nose, sneezing, or watery eyes although repetitive exposures can lead to severe allergy that can progress to asthma. Symptoms may occur at the time of exposure or be delayed for hours.

Continued exposure of allergic individuals increases the chances of severe asthmatic reactions or anaphylaxis, a sudden, severe, allergic reaction that can be fatal without immediate emergency care including an injection of epinephrine. Prolonged exposure can lead to irreversible disease. Only about 50% of those with occupational asthma recover completely after exposures are ended. Diagnosis of lab animal allergy is based on patient history, physical examination, and skin testing. Symptomatic persons should complete a UMDNJ incident form and be evaluated by a physician.

Prevention of Animal Allergies

Routinely implement the following procedures to prevent animal allergies from developing.

- * When possible, perform animal manipulations in a ventilated hood or a biosafety cabinet. If this is not possible, a respirator may be helpful. Use of a respirator requires medical clearance, fit-testing and training.
- * When you're not working in a hood or cabinet, make sure that the ventilation system in the room is working properly. If there is doubt, contact Physical Plant.
- * Wear lab coats over street clothes when animals are handled to decrease contamination of street clothes.
- * Reduce your skin contact with animals by wearing vinyl gloves and long-sleeved lab coats.
- * Laboratory clothes should be left in the lab and should not be worn while eating or after work.
- * Wash hands frequently. Wash hands and face before leaving the work area.
- * Avoid touching your hands to your face while working with animals and animal equipment.
- * Keep cages and your work area clean.

Medical Surveillance

All personnel with significant laboratory animal contact must complete a questionnaire to be enrolled in a medical surveillance program so that risk factors can be evaluated by a medical professional. It is highly recommended that personnel who work in rooms where animals are routinely kept should also be enrolled. If you have symptoms from working near or with laboratory animals, inform your supervisor, complete an incident report and contact UMDNJ Risk and Claims to obtain a referral to a physician.

If medical treatment is not immediately available then an epinephrine pen should be available for trained personnel to administer for emergency treatment of Anaphylaxis.

Respirator Use

The NJ Public Employees' Occupational Safety and Health Program regulations detail very stringent requirements concerning the wearing of respirators in the workplace. Wearers must receive a medical evaluation to ensure that they are physically capable of wearing a respirator. They must also be "fit-tested" by EOHSS to ensure that there is no leakage around the face-piece. In addition, a written respiratory protection program is required, as well as detailed training.

The routine use of respirators is not recommended as an allergen control technique. If extensive medical treatment (for example, the use of steroid tablets) is required, or if repeated asthma attacks occur after all steps have been taken to reduce exposure, the affected worker should be reassigned or leave the offending job. If you have any reason to believe you need a respirator, notify your supervisor or EOHSS. EOHSS will evaluate the situation and make recommendations for respiratory protection and/or other needed control measures.

Protecting others while moving animals through the building

When animals are moved through the building, non-research staff and/or visitors to the University could be unexpectedly exposed to animal allergens. Precautions for moving animals include the following:

- * Avoid bringing animals into the laboratory unless it is not feasible for the procedures to be performed in the animal facility,
- * Use service elevators and avoid moving animals through public areas.
- * If transportation is necessary, the animals should be in a microisolator (filter top cage) or other approved filtered transport box.

Regulatory Spotlight

FAA Inspections

The NRC and the EPA are not the only regulators who conduct surprise inspections of universities, hospitals and labs that handle hazardous materials. The Federal Aviation Administration (FAA) must now be added to the list. In the past few years, the FAA has inspected many research centers and Universities, including Dana Farber Cancer Institute, University of Pennsylvania, Indiana University Perdue University Indianapolis (IUPUI), Weill Cornell Medical College, Iowa State, and others.

Violation notices have been given to institutions that can't provide documentation of training for people who are involved in shipping dangerous goods which includes dry ice, genetically modified organisms, infectious materials, chemicals, radionuclides, and liquid nitrogen. Training is required every 2 years for persons who prepare, label, or fill out paperwork for these shipments. Diagnostic specimens are listed in the 2004 dangerous goods regulations as UN 3373, and they have specific packaging and labeling requirements since they may contain infectious substances. Violations have also been given for specific shipments containing dangerous goods that were not declared as such or were improperly packaged or labeled.

IUPIU was cited for using the Campus Police as the emergency contact on shipping papers and labels. The phone number of a person who is knowledgeable about the contents of specific packages must be available around the clock in case any shipping questions arise. UMDNJ has contracted a service called Chem-Tel to provide the 24 hour emergency phone number. Personnel must complete an online form to notify UMDNJ and Chem-Tel before sending out a shipment containing infectious materials or other dangerous goods. All personnel filling out the online Chem-Tel form must be current with their training requirements. The Chem-Tel form and a factsheet on shipping hazardous materials are posted at <http://www2.umdnj.edu/eohssweb/publications/factsheets.htm#Shipping>.

EOHSS provides the required training on shipping and transport of hazardous materials for University personnel. EOHSS also offers an interactive CD-ROM for use on your personal computer to satisfy training requirements. Personnel may elect to complete training off-site but should send a copy of their training certificate to the campus EOHSS office. EOHSS will be providing the names of personnel who are up-to-date with training and who are therefore authorized to ship dangerous goods to the deans and research offices of each campus. Persons who are not up to date with training are not authorized to ship dangerous goods.



The Department of Environmental and Occupational Health and Safety Services (EOHSS) provides support to the University community through the development and implementation of health and safety programs. Some of the key areas in which EOHSS provides assistance are: hazard evaluation and control, consultation and technical assistance, safety education and training, hospital safety, fire/life safety, emergency chemical spill response, chemical waste management, and laboratory safety.

Contact EOHSS at:

Newark

65 Bergen Street
Bergen Building, Room 443
Newark, NJ 07107
(973) 972-4812/Fax (973) 972-3694

Piscataway/New Brunswick

675 Hoes Lane, Trailer #1
Piscataway, NJ 08854
(732) 235-4058/Fax (732) 235-5270

Camden/Stratford

Primary Care Center
40 E. Laurel Rd., Suite 1031
Stratford, NJ 09084
(609) 566-6189/Fax (609) 566-6352

BenchSmart is published periodically by the Department of EOHSS for UMDNJ laboratory personnel. This newsletter will address current and relevant laboratory health and safety information for the research community. If you have any comments, would like to submit an article, or would like to have us address a particular topic, please contact Lindsey Kayman, CIH, at (732) 235-4058 or by e-mail at kayman@umdnj.edu or Gaitree Tiawaree-McNab, CBSP at (973) 972-4812 or e-mail mcnabga@umdnj.edu.

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US Army Research Grant Requirements

If you are applying for an Army Grant, all persons listed on the grant must be up-to-date with safety training, the Laboratory Safety Plan fill-in-the-blanks must be completed, and all safety deficiencies identified in the last laboratory inspection must be corrected.

The Department of Defense (DOD) requires an approved Facility Site Plan and written assurances from EOHSS, as well as the PI, that the University's safety and health policies and programs are being complied with and that hazards associated with the research are identified and addressed. EOHSS has obtained five-year approvals for the NJMS and RWJMS facility safety plans. When submitting a grant application, researchers from these schools need to provide the DOD with a written "Proposal Safety Plan" and a "Certificate of Environmental Compliance (CEC)" form which has been signed by EOHSS.

Follow the campus specific links on the EOHSS home page, <http://www2.umdnj.edu/eohssweb/eohss.htm> for detailed instructions on having the CEC signed.

You will need to submit the names of the personnel on the grant, the room numbers where the work will be performed, as well as the grant abstract to EOHSS several weeks in advance of the grant due date to allow time for EOHSS to review training and inspection records and to review the abstract. If this is not possible, contact EOHSS as soon as possible to ensure the grant is not delayed. If you are applying for an Army Grant and need assistance, contact your campus Research Office and/or EOHSS.

Recent Incidents

Ethidium Bromide Extraction Vacuum Incident

As required by the University's Hazardous Waste Minimization program, a laboratory was filtering an aqueous ethidium bromide solution through a bed of activated charcoal to remove the ethidium bromide so that the filtrate could be poured down the drain.

About 200 ml of a buffered ethidium bromide was being filtered into a standard Erlenmeyer flask using the house vacuum. During the extraction the flask imploded, causing broken glass and the solution to fly into the air. Luckily, the operation was being conducted inside the lab hood and most of the debris was contained. The extractor being used was the Schleicher and Schuell (S&S) ethidium bromide waste reduction system.

What went wrong? The S&S extractors have a side arm which led lab personnel to use an Erlenmeyer flask rather than a filtering flask for this operation. However, standard Erlenmeyer flasks are not designed to be used under vacuum. A filtering flask without a side arm should be used - these are able to withstand a vacuum. Glass models will be marked "filtering flask" to avoid being confused with a standard Erlenmeyer. Pyrex filtering flasks without side-arms are available from a number of vendors.

Information on ethidium bromide waste disposal is included in the revised Laboratory Safety Plan. In addition, a factsheet is available on the EOHSS webpage at: <http://www2.umdnj.edu/eohssweb/publications/etbr.htm>.

In the News

Anthrax

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As this incident illustrates, labs sending and receiving killed or attenuated bugs must implement strict standard operating procedures that have been approved by their own Institutional Biosafety Committee (IBC).

The focus of the ongoing investigation by the FBI and Centers for Disease Control and Prevention (CDC) is on the vendor, Southern Research Institute (SRI). According to Southern Research Institute, the Oakland researchers asked that the bacteria be killed by boiling water. Standard inactivation techniques include gamma rays, X-rays, ultraviolet light and autoclaving, or pressurized steam treatment, followed by filtering with a fine nylon mesh to block the escape of whole, live spores. SRI reported that before being shipped, the material was cultured for 48 hours and didn't grow. Upon arrival of the specimen, the Oakland lab workers also tried to grow it in culture for 48 hours but failed, and also concluded it was dead. An SRI spokesman indicated they were reviewing their quality control procedures.

Resources for this article:

1. J.D. Miller, *The Scientist - US Lab is Sent Live Anthrax: Incident at Oakland, Calif., Children's Hospital Research Lab Exposes Seven Workers* 6/11/04
2. *Medical News Today - Anthrax, Live Samples Sent to Oakland Hospital For Children by Mistake, Workers Exposed* 6/1/04
3. R Veseley and I Hoffmann, *The Argus - Anthrax Scare Underscores Research Safety*, 6/12/04